

# Systematic studies on fishes belonging to the Genus *Coilia* Gray, 1831<sup>1</sup>

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There has been considerable confusion in regard to the systematics of species of fishes of the genus *Coilia* commonly known as rat-tailed anchovies. Most of the confusion is due to the fact that adequate attention has not been paid to intraspecific variation in numbers of pectoral filaments, scutes and anal fin rays; the latter often misleading due to an artefact resulting out of caudal damage and subsequent regeneration. It is believed that, in all, four species occur in India.

## INTRODUCTION

The fishes of the genus *Coilia*, commonly known as rat-tailed anchovies are of importance in the coastal fisheries at some places on the east coast of India. There has been considerable confusion in regard to the systematics of species of the genus. Fowler (1941) distinguished 14 species; 10 with maxilla not reaching beyond gill opening and 4 with maxilla reaching beyond gill opening. Most of the confusion existing in distinguishing the species is due to the fact that adequate attention has not been paid to intraspecific variation in number of pectoral filaments, scutes and anal fin rays; the latter often misleading due to an artefact resulting out of caudal damage and subsequent regeneration. The work of Whitehead (1966-1967) and Whitehead *et al.* (1966) has helped to remove the confusion in regard to the identification of most species. The key given by Whitehead (1967b) is particularly useful. The present contribution records and describes three species, *C. ramcarati* (Ham.-Buch., 1822), *C. korua* Dutt & Seshagiri Rao, 1972 and *C. dussumieri* Val. 1848 from Indian waters.

## MATERIALS AND METHODS

Fishes of the genus *Coilia* were obtained from shore seine catches near Gollapalem, Masulipatam (Krishna District) and Kakinada (east

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Godavari District) during 1966-70. In taking linear measurements total length was measured from tip of snout to longest caudal ray; standard length from tip of snout to mid-base of caudal fin; head length from tip of snout to hindmost point on operculum; depth is maximum depth.

### **Coilia Gray, 1831**

*Mystus* Lacépède, 1803, *Hist. Nat. Poiss.*, 5:466 (Type: *Mystus clupeioides* Lacépède = *Clupea mystus* Linnaeus) (Pre-occupied by Gronow, 1763; Kliein, 1775; Scopoli, 1777).

*Coilia* Gray, 1830, *Illustr. Ind. Zool.*, 1, pt. 1: pl. 85, fig. 3 (caption only); 1831, *Zool. Misc.*: 9 (Type: *Coilia hamiltoni* Gray = *Mystus ramcarati* Ham.—Buch.).

The genus *Coilia* includes Anchovies with their tail tapering to a point. Lacépède (1803) based his genus *Mystus* on a species of *Coilia*, but the name was pre-occupied elsewhere. *Coilia* Gray has been used for the rat-tailed anchovies for over a century. Jordan & Seale (1926) attempted to split the genus *Coilia* by creating a new genus *Demicoilia* for species with truncated caudal peduncles. But this condition of truncated caudal peduncle is due to its damage and subsequent regeneration. Bleeker's genus *Leptonurus* for species with light organs is also inadmissible as these light organs disappear beyond recognition during preservation in formalin as shown by Haneda (1961) and Dutt & Seshagiri Rao (1974).

Whitehead *et al.* (1966) and Whitehead (1967) have drawn attention to the need for revision of the genus.

The following key is useful in distinguishing the species.

- I Pelvic rays i 8-9 *C. ramcarati* (Ham.-Buch., 1822)
- II Pelvic rays i 6
  - (A) Pectoral filaments 4-6
    - (i) Scutes 4-6 + 6-8. Pearly spots along flanks *C. dussumieri* Val., 1848
  - (B) Pectoral filaments 10-14
    - (i) Scutes 4-6 + 8-9 *C. reynaldi* Val., 1848
    - (ii) Scutes 7-9 + 9-11 *C. korua* Dutt & Seshagiri Rao, 1972

The revised description of the species is as under:

### ***Coilia ramcarati* (Ham.-Buch., 1822)**

*Mystus ramcarati* Hamilton-Buchanan, 1822, *Fishes of Ganges*: 233 (type locality: Ganges estuaries).

*Coilia cantoris* Bleeker, 1853, *Verh. Bat. Gen.* 25:148, pl. 6, fig. 2.

*Coilia quadragesimalis* Valenciennes, 1848, *Hist. Nat. Poiss.* 21:83.

Type: Neotype, a fish of 134.9 mm S.L. (147.0 mm tot. l.), ex Ganges, British Museum (Natural History), 1858.8.15.104 (designated type by Günther, 1868:403), described by Whitehead, 1967, *J. Mar. Biol. Ass. India*, 9(1):31-33.

Material examined: 25 fishes, 142-219 mm S.L. (Gollapalem 11:12:66).

*Description:*

Br. St. 10-11, D I 12-14, P vi + 4-6, V i 8-9, A 90-100  
g.r. 20-24 + 28-31, scutes 4-5 + 10-11.

In percentages of standard length: total length 108.2-112.2, body depth 18.0-20.2, head length 17.4-19.6; snout length 3.1-4.0, eye diameter 3.1-4.3, maxilla length 11.8-13.0; pectoral fin length (longest filament) 40.3-52.5, pelvic fin length 9.1-11.8; pre-dorsal distance 24.0-27.6, pre-pelvic distance 22.2-28.2, pre-anal distance 39.8-43.5.

Body compressed, depth nearly equal to head length, deepest below dorsal origin, tapering gradually from behind vent to tail. Belly somewhat rounded below pectoral origin and compressed from pelvic origin to vent. Abdominal serrae beginning well behind pectoral origin. Snout produced, equal to eye diameter. Lower jaw slender with a series of conical teeth and with prominent knob at dentary symphysis. Maxilla does not reach gill opening, extending beyond second supra-maxilla and tapering posteriorly. A single series of fine teeth along lower edge of maxilla. Two supra-maxillae, the anterior small and the posterior slender anteriorly and expanding posteriorly, the anterior portion being hidden behind the maxilla, when viewed from outer side.

Pseudobranch present, exposed nearly equal to eye diameter, with about 17-21 filaments. Gill rakers slender, twice length of corresponding gill filaments and equal to eye diameter.

Scutes sharply keeled, beginning midway between pectoral and pelvic bases.

Dorsal fin preceded by small scute-like spine. Distance from snout tip to dorsal origin four times in total length. Pectoral with 6 free filaments, the longest reaching between 29th and 32nd anal ray; longest branched ray not reaching pelvic base. Pelvic fin long, slightly less than postorbital length of head, its origin before dorsal origin, twice as close to pectoral base as to anal origin. Anal origin behind vertical from last dorsal ray by 2 eye diameters.

*Colour:* Dorsal side brownish descending on flanks above, flanks golden yellow. Unbranched dorsal rays dark, rest of fin pale yellow. Margin of anal and caudal dark. Pelvic pale, tip usually dark.

*Note:*

*C. ramcarati* can be easily distinguished from all other species of *Coilia* by high pelvic count (i 8-9, in all others i 6). Whitehead (1967) has shown that *C. quadragesimalis* is in fact *C. ramcarati*. Earlier, Jones & Menon (1952) pointed out that the description of *C. contoris* by Day (1889) strongly suggests a juvenile *C. ramcarati*. This was confirmed by Whitehead *et al.* (1966) after re-examination of the type material.

This species grows to a length of about 25 cm.

**Coilia korua** Dutt & Seshagiri Rao, 1972

*Coilia korua* Dutt & Seshagiri Rao, 1972, *J. Bombay nat. Hist. Soc.*, 69(1): 136-138, Type locality, Gollapalem, Krishna District.

*Material examined:*

(a) 30 fishes, 100-116 mm S.L. Kakinada (9-5-70).

(b) 19 fishes, 90-118 mm S.L. Kakinada (5-11-70).

*Description:*

Br. St. 10-11, D I 12, P xii-xiii + 5-7, V i 5-6, A 101-106,

g.r. 23-26 + 30-33, Scutes 7-9 + 9-11 (total 17-19).

In percentage of standard length: total length 109.1-111.6, body depth 20.0-20.9 head length 17.0-18.3; snout length 3.6-4.5, eye diameter 4.1-4.7, maxilla length 12.5-14.2; pectoral fin length (longest filament) 40.0-46.6, pelvic fin length 8.1-9.1; pre-dorsal distance 26.6-29.1, pre-pelvic distance 22.7-24.7, pre-anal distance 36.6-38.1.

Body compressed, depth slightly greater than head length, deepest below dorsal origin, tapering gradually to tail. Belly slightly convex, compressed and keeled from below pectoral origin to vent. Snout produced, equal to eye diameter. Lower jaw slender, with a series of small conical teeth and with prominent knob, at dentary symphysis. Maxilla does not reach gill opening; a series of fine teeth on premaxillae and along lower edge of maxillae. Two supra-maxillae, the anterior (first) delicate, nearly triangular and the posterior (second) slender anteriorly and expanding posteriorly, the anterior portion being hidden behind the maxilla, when viewed from outer side.

Pseudobranch present, exposed, equal to eye diameter, with about 10-14 filaments. Gill rakers slender, equal to eye diameter and twice length of corresponding gill filaments. Muscular portion of isthmus reaching forward to hind margin of branchiostegal membrane.

Scutes sharply keeled, beginning below pectoral origin.

Dorsal fin preceded by small scute-like spine. Distance from snout tip to dorsal origin less than four times in total length. Pectoral with 12-13 filaments, the longest reaching 23rd anal ray; longest branched ray reaching pelvic base. Pelvic length less than postorbital length of head; its origin before dorsal origin, nearer to pectoral base than to anal origin, equal to dorsal anal interspace (linear). Anal origin behind vertical from last dorsal ray by one eye diameter.

*Colour:* Dorsal side greenish, flanks golden yellow, abdomen and ventral side pale yellow. Fins hyaline, unbranched dorsal rays usually dark.

*Note:*

*C. korua* resembles *C. reynaldi*, *C. coomansi*, *C. polyfilis* and *C. borneensis* in pectoral filament number (12-14), but differs from all of them in the number of abdominal scutes (7-9 + 9-11; total 17-19) and

anal fin rays (101-106). Fowler (1941) mentions only 11 free pectoral rays in *C. polyfilis* for which there is no record besides the original description of Volz (1903) which is inadequate. The present species can be easily identified with the help of key given by Whitehead (1967), its place being between *C. reynaldi* and *C. coomansi*.

### *Coilia dussumieri* Valenciennes, 1848

*Coilia dussumieri* Valenciennes, 1848, *Hist. Nat. Poiss.*, 21:81, pl. 610, (type locality: Bombay, mahe, Pondicherry).

*Leptonurus chrysostigma* Bleeker, 1849, *Verh. Bat. Gen.* 22:14.

*Demicoilia margaritifera* Jordan and Seale, 1926, *Bull. Mus. Comp. Zool.*, 67: 363.

Type: *Lectotype*, a fish of 155.4 mm S.L. (173.6 mm tot. 1.), ex Bombay, coll. Dussumier, Museum National d'Histoire Naturelle, Paris, 3749, (redescribed by Whitehead, 1967, *Bull. Br. Mus. Nat. Hist.* (Zool.) Suppl. 2. 154-55).

#### *Material examined:*

(a) 30 fishes, 120-156 mm S.L. Gollapalem (11-12-66)

(b) 10 fishes, 125-142 mm S.L. Gollapalem (26-11-67)

(c) 12 fishes, 120-130 mm S.L. Masulipatam (8-1-68)

#### *Description:*

Br. St. 9-11, D I 10-11, P v-vi + 8-11, V i 6, A 100-112, g.r. 17-21 + 24-26, scutes 5-6 + 7-9.

In percentages of standard length: total length 108.6-111.7, body depth 18.7-21.7, head length 17.6-19.3 snout length 3.6-4.6, eye diameter 3.7-4.6, maxilla length 13.7-15.5; pectoral fin length (longest filament) 39.4-47.0, pelvic fin length 5.5-6.9; pre-dorsal distance 25.0-27.2, pre-pelvic distance 23.9-26.6, pre-anal distance 37.3-40.6.

Body compressed, depth nearly equal to head length, deepest below dorsal origin, tapering gradually to tail. Belly slightly convex, compressed from below pectoral origin to vent. Snout produced, equal to eye diameter. Lower jaw slender, with a series of small conical teeth and with prominent knob at dentary symphysis. Maxilla reaches gill opening, extending well beyond second supra-maxilla and tapering gradually. A single series of fine teeth along lower edge of maxilla. Two supra-maxillae, the anterior small, and the posterior slender anteriorly and expanding posteriorly, the anterior portion being hidden behind the maxilla, when viewed from outer side.

Pseudobranch present, exposed, small, less than eye diameter, about 9-11 short filaments. Gill rakers slender, twice length of longest gill filament.

Scutes sharply keeled, beginning behind pectoral origin.

Dorsal fin preceded by small scute-like spine. Distance from snout

tip to dorsal origin more than four times in total length. Pectoral with 5-6 free filaments, the longest reaching 35th anal ray or beyond; longest branched ray reaching pelvic base. Pelvic fin short, much less than post-orbital length of head, its origin below dorsal origin, slightly nearer pectoral base than anal origin. Anal origin below vertical from last dorsal ray by 2 eye diameters.

*Colour*: Dorsal side brownish, flanks yellowish with silvery reflections during life, becoming deep yellow on ventral side before anal. Posterior portion of anal and whole of caudal pigmented. A series of 20-28 pearly spots beginning slightly above base of pectoral, a second series of 23-30 spots beginning just behind pectoral base and extending posteriorly beyond first series. A third series of 6-10 spots beginning just behind gill opening on either side of isthmus. About four spots on either side of isthmus which are roughly in line with the third series. A row of 7 spots on either side of lower jaw ventrally. A patch of brownish dots on the snout.

*Note*:

*C. dussumieri* is the only species, so far known, with pearly spots (Luminous organs) on flanks. Jordan & Seale (1926) described *Demicoilia margaritifera* as having pearly spots on flanks and with a deep caudal peduncle. The description differs from that of *C. dussumieri* in two respects, shorter anal fin and deeper caudal peduncle. This may be the result of caudal damage and subsequent regeneration, which is most common among these fishes. *D. margaritifera* should also be referred to *C. dussumieri*. One specimen of *C. dussumieri* which shows an extreme case of caudal regeneration has been recorded.

***Coilia reynaldi* Valenciennes, 1848**

Type: *Lectotype*, a fish of 97.0 mm S.L., 106.0 mm tot. 1., ex Irrawady River, Rangoon, Museum National d'Histoire Naturelle, Paris. 3733, redescribed by Whitehead, 1967a, *Bull. Br. Mus. Nat. Hist. (Zool.)* Suppl. 2:150-152.

Whitehead (1967a) opined that *C. borneensis* is almost certainly a synonym of *C. reynaldi*. This species could not be collected from Andhra coast. *C. borneensis* is known to occur on Madras coast while *C. reynaldi* occurs in the Ganges estuary.

***Coilia neglecta* Whitehead, 1967**

*Coilia neglecta* Whitehead, 1967, *J. Mar. biol. Ass. India*, 9(1):33-36 (type locality: Arabian sea).

Type: *Holotype*, a fish of 160.8 mm S.L., (175.0 mm tot. 1.) ex Ara-

bian Sea deposited in the U.S. National Museum; *Paratypes*, 10 fishes, 141.5-169.5 mm S.L., British Museum (Natural History), 1967.11.20.560-569., Whitehead, 1967, *J. Mar. biol. Ass. India*, 9(1):33-36.

*C. neglecta* resembles *C. dussumieri* in meristic and morphometric characters. The only difference being the absence of light organs on flanks in the former. These light organs disappear beyond recognition during preservation (Haneda 1961; Dutt & Seshagiri Rao 1974). Since the species was originally described basing solely on preserved material, it is a doubtful species until some stable characters are found to distinguish it from *C. dussumieri*.

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